GOVERNMENT OF INDIA

METEOROLOGICAL DEPARTMENT

INDIA WEATHER REVIEW, 1945

ANNUAL SUMMARY

PART B

SNOWFALL

CONTENTS

Published by the Authority of the Government of India

UNDER THE DIRECTION OF

S. K. BANERJI, D.Sc., O.B.E.,

Director General of Observatories

PRINTED BY THE MANAGER, RESIDENCY PRESS,
HYDERABAD DECCAN, INDIA.
1947

Price As. 8 or 9 d.

National Oceanic and Atmospheric Administration

Environmental Data Rescue Program

ERRATA NOTICE

One or more conditions of the original document may affect the quality of the image, such as:

Discolored pages
Faded or light ink
Binding intrudes into the text

This document has been imaged through the NOAA Environmental Data Rescue Program. To view the original document, please contact the NOAA Central Library in Silver Spring, MD at (301) 713-2607 x124 or www.reference@nodc.noaa.gov.

Information Manufacturing Corporation
Imaging Subcontractor
Rocket Center, West Virginia
September 14, 1999

INDIA WEATHER REVIEW, 1945.

ANNUAL SUMMARY.

PART B.

SNOWFALL.

This part contains a summary of the reports of snowfall in the mountain regions to the north and northwest of India. These reports are collected by local officers from the local residents, headmen of villages or from travellers who have passed through the region and are then transmitted to this office.

The amount of snowfall is usually measured by finding the depth of undisturbed snow lying on the ground and such measurements are given in feet and inches. At places provided with raingauges the amount of snow collected in the gauge is melted and measured as rain. This is indicated in the text and the amounts are then given in inches and cents.

Cold Weather Period, January and February.

I.—Afghanistan.

Kabul.—In the Kabul valley snow fell on 7 days in January and 6 days in February to a total depth of 22 in. in each month. The falls were above the average. The accumulations of snow on the ground at the end of January were about 8 in. but these were clearing up from the open places by the end of February. The peaks of the Hindukush and the Paghman ranges and the surrounding hills were thickly covered with snow throughout the period. The passes were open to traffic.

II.—Baluchistan.

Quetta.—Snow fell at the station on 5 days in January giving 25 in. of snow. Three of the falls were heavy in character. In February, however, there was only one slight fall. Snow accumulations on the ground disappeared on the 8th of February.

III.—North-West Frontier Province.

(*a*) *Hazara.*—Snow fell on 18 days in January and 4 days in February. The falls were reported to be unusually heavy in January and the snow-line descended to 3,000 ft. In February, however, the weather was mild and the snow-line was at 6,000 ft. The falls and the accumulations were much above the average in January and below the average in February. The following table gives the approximate total depths of falls and accumulations for the period :—

Locality.	Height a. s. l.	January.		February.	
		Falls.	Accumulations.	Falls.	Accumulations.
	Ft.	Ft.	Ft.	Ft.	Ft.
Thandiani ...	8,800	14	6	1	3½
Dagri	...	16¾	7½	3	4
Birangali ...	6,600	6½	5	2¼	3⅛
Sattu		13	5½	1⅛	3
Kalabagh ...	7,900	13½	4½	¼	3
Dungagali ...	8,000	14½	6	¾	4½
Narang	8,000	11½	5	2	2
Tludran	7,500	10½	3	2	2
Kagan	7,000	12	3	1¼	1¼
Jared	5,000	5½	½	1	½
Malkandi ...	4,450	5½	¾	¼	...
Jachha	...	22½	4	¼	...
Sundi	...	13	4	¾	...

(*b*) *Malakand.*—Snow fell on the ground on 9 days in January and 6 in February the depths of the falls varying from 2 to 9 ft in January and 1 to 6 ft. in February. The falls were above the average. The accumulations of snow on the surrounding high peaks were estimated to be as follows and were above normal :—

Locality.	January.	February.
	Ft.	Ft.
Lowarai	9	4
Bashkar	10	5
Mankial	11	6
Illam and Dwa Sarai	9	3
Hinduraj	10	5

(*c*) *Khyber Agency.*—Snowfall occurred in the Tirah Valley and the surrounding hills on 4 days in January and 2 days in February. The total depth of the falls over the plains was 12½ ft. and 4 ft. respectively. On the hills the falls were heavier. The accumulations of snow were reported to be 7 to 9 ft. on the Morga hills. On the hills surrounding Landikotal snow fell to a depth of 3 to 5 ft. in January. The falls were above normal. There was no snowfall in February.

(*d*) *Kohat.*—Snowfall occurred only in January and was confined to the highest mountains and peaks. Samana range (6,670 ft.) was much below the snowline. Fort Lockhart had about 3½ ft. of snow during January and this was normal.

IV.—Kashmir.

(*a*) *Skardu.*—Snow fell on 15 days in January and 3 days in February and the snow converted into water measured 0·76 and 0·39 in. respectively in the 2 months. The surrounding mountain ranges also had several snowfalls. The

accumulations at the station proper were 18 in. at the end of January and 5 in. at the end of February, whereas on the surrounding passes these were 7 to 8 ft. at the end of January and 11 to 12 ft. at the end of February. The falls and accumulations were slightly above normal.

(*b*) *Dras.*—Snow fell on 5 days in January and 6 days in February. The falls were below normal in January and about normal in February. The accumulations of snow at Dras amounted to 49 in. at the end of January and to 58 in. at the end of February. On the Mushkoo hill the accumulations were reported to be 9½ ft. and 13 ft. respectively at the end of 2 months and these were about normal. All the hills surrounding Dras were totally covered with snow down to the ground and the Zojilla Pass was closed to traffic throughout the period.

(*c*) *Srinagar.*—There were 17 snowfalls in January and 8 in February. At the station proper, the falls of snow melted and measured as rain varied from 0·01 to 0·37 in. in January and 0·01 to 0·17 in. in February. On the Pir Panjal Range, snow fell to a depth of 12 to 16 ft. in January and 1 to 4 ft. in February. The accumulation on the Banihal Pass in the Pir Panjal Range were 27 ft. at the end of January and 24 ft. at the end of February. The falls and accumulations were above normal.

(*d*) *Kargil.*—Snow fell on 7 days in January and 5 days in February and the snow melted and measured as rain amounted to a total of 0·90 in. and 1·65 in. in the 2 months. The accumulations at the station were 1½ ft. and 2½ ft. respectively at the end of the 2 months, while on the surrounding high peaks they amounted to 8 ft. and 9 ft. The falls and accumulations of the season were slightly above normal.

(*e*) *Sonamarg.*—There were 17 snowfalls in January and 18 in February. The snow when melted and measured as rain amounted to 3·15 in. and 3·05 in. in the 2 months. The falls were below normal in January and above normal in February. The accumulations at Sonamarg proper at the end of the 2 months were 5 ft. and 9 ft. respectively while those on the Zojilla Pass were reported to be 7 ft. in January and 15 ft. in February. The accumulations at the end of February were about normal.

(*f*) *Leh.*—Snow fell on 12 days in January and 8 days in February, and the falls were about the average. There were about 7 in. of accumulations at the end of each of the months and the passes remained blocked throughout the period.

V.—The Punjab.

(*a*) *Rawalpindi.*—Snow fell on 8 days in January and once in February aggregating to depths of 9 ft. 7 in. and 3 in. respectively. The falls during January were above normal. The snowline descended on Murree, Pindi Point, Kashmir Point and the Patriata.

(*b*) *Chamba.*—Tissa Range :—Snow fell on 6 days in January and 4 days in February. The snowline descended to 4,000 ft. on one occasion in February. The falls were above normal in January and below normal in February. The well-known passes were closed to traffic. The following table gives the falls at certain stations during the 2 months :—

Locality.	Height a. s. l.	January.		February.	
	Ft.	Ft.	In.	Ft.	In.
Tissa	4,500	6	7	0	1
Alwas	...	...		1	4
Chhatri	7,500	...		1	1
Khanga	6,500	12	4	0	10
Bara	7,550	12	10	0	6
Sloh	7,000	11	1	0	9
Sagti	7,500	9	7	1	1
Shaal	7,000	11	2	...	
Chanju	...	...		0	5
Shenger	7,500	18	3	1	6

Bhandal Range.—There were 6 falls of snow in January and 4 in February giving an aggregate of 10 ft. and 4 in. of snow respectively in the 2 months. The snowline descended to 6,000 ft. in both the months. All the higher passes were thickly covered with snow and no information is available about the actual depth of accumulations. The falls were above the average in January and below it in February.

Kalatop Range.—Snow fell on 10 days in January and 8 days in February giving a total depth of 25½ ft. and 1½ ft. respectively. The snowline descended to as low a height as 2,000 ft. in one of the January snowstorms and in the opinion of the local inhabitants, the snowfall during January was by far the heaviest experienced by them over a large number of years. At Kalatop, the accumulations of snow were estimated to be 25 ft. at the end of January and 5 ft. at the end of February. Snow had melted away on the warmer slopes by the end of the period. The falls were much above normal in January and below normal in February.

Chamba Range.—No report has been received for January. During February snow fell on high altitudes, the snowline descending to 4,500 ft. The falls are reported to have been heavy on the high peaks adjoining the Kangra district. The falls were above normal.

Pangi Range.—At Killar (8,400 ft.) snow fell on thirteen days in January to a total depth of 2 ft. The falls were normal. The heavy and unprecedented snowfalls that occurred in the outer Himalayas during the first fortnight of January did not extend into the Pangi Range. The accumulations at the end of January were 10½ ft. at 8,400 ft., no information being available regarding the higher passes. No report has been received for the month of February.

(*c*) *Kulu (Kangra District).*—Snowfalls of average depths of 15 ft. and 8 ft. respectively occurred in the high ranges of the Himalayas in the Kangra and Palampur tahsils and in the Kulu Sub-division during January and February. The snowline descended to a height of 8,000 ft. in February.

The falls were above the average in January and below it in February. Snow had accumulated to a depth of 18 ft. in January and 11 ft. in February on high ranges. The accumulations on the higher passes varied between 10 and 18 ft. in January and 1 and 7 ft. in February.

(*d*) *Kilba Hills* (*Simla District*).—There were twelve falls in January and five in February to total depths of 5½ ft. and 1 ft. respectively. Snowline descended to 5,800 ft. and 8,080 ft. respectively in the 2 months. The falls were above normal in January and below normal in February. All the well-known passes, viz., Charang, Rupan, Buran and Shathal and the Kailas peak were unpassable during the period.

VI.—The United Provinces.

(*a*) *Almora*.—The falls and accumulations during the period were as shown below :—

Locality.	January.	February.
Falls.	Ft.	Ft.
Malla Danpur	7½	3½
Malla Darma	13	3
Chaudans	35	6½
Byans	37	6½
Malla Johar	...	...
Accumulations.		
Pindar Valley	63	63
Nandakhat	63	63
Sundar Dhunga	63	63
Bankatia	80	80
Masurleg	40	6½
Lipu	37	5½
Lampia	55	8
Nuwe	45	3

The falls and accumulations were above the average in January and below it in February.

(*b*) *Garhwal*.—There were 7 snowfalls in January and 9 in February, the depths in higher altitudes being 1 ft. to 4 ft. in January and ½ in. to 1 ft. in February. The snowline descended to 2,500 ft. in both the months. The accumulations on the higher passes were about ½ ft. at the end of each month. The falls were slightly above normal in January and below normal in February. The accumulations at the end of the period were below normal.

(*c*) *Muktesar*.—Snow fell on 10 days in January and when melted and measured as water amounted to a total of 9 in. and 71 cents. The falls were much above the average. No information is available for February.

VII.—Assam.

(*a*) *Kamrup*.—The snowfall during January and February is given below :—

Pumthang	2 to 3 ft.
Chetangla	2 to 4 ft.
Banthangla	1 to 2 ft.
Phrungsangla	2½ to 4 ft.
and Bromfula..	1 to 1½ ft.

The falls were reported to be normal. The passes to Bhutan were open to traffic.

(*b*) *Balipara Frontier Tract*.—Snow fell both in the upper and lower hills of the Balipara Frontier Tract during the period. The falls that occurred from the 6th of January till about the beginning of February are reported to have been the heaviest in living memory. During the first and the second weeks of January, the snowline descended to 5,000 ft. in the Aka Hills. The falls were much above normal. The passes through the upper hills were closed for the best part of the period; the lower passes were also closed for several days.

Hot Weather Period, March to May.

I.—Afghanistan.

Kabul.—There was no snowfall in Afghanistan after the 3rd March. At the end of May, the Shibar Pass was clear of snow and the accumulations on the Paghman and Hindukush Ranges were confined to the tops and the crevices. The accumulations were reported to be above normal.

II.—Baluchistan.

Quetta.—There was a light snowfall on the 2nd March and the snow melted away immediately. Even from the highest peaks, snow disappeared completely by the 9th of April.

III.—North-West Frontier Province.

(*a*) *Hazara*.—The following table gives the total amounts of snowfall during and the accumulations at the end of March at various elevations. The falls and accumulations were slightly below normal.

Locality.	Falls.		Accumulations.	
	Ft.	in.	Ft.	In.
Thandiani (8,800 ft) ...	0	9	2	6
Dagri	1	5	3	4
Birangali (6,600 ft.) ...	0	7½	2	0
Sattu	0	7½	2	8
Kalabagh (7,900 ft.) ...	1	9		*Nil*
Dungagali (8,000 ft) ...	2	3		*Nil*
Malkandi (4,450 ft.) ...	0	4		*Nil*
Jared (5,000 ft.)	1	8		*Nil*
Kagan (7,000 ft.)	3	0	1	0
Paludran (7,500 ft.) ...	4	0	2	0
Narang (8,000 ft.)	4	0	2	0
Jashha	0	3		*Nil*
Sandi	0	3		*Nil*

There was no snowfall at elevations below 10,000 ft., in April and the accumulations at higher elevations at the end of May varied from 1½ to 5½ ft. depending upon the height.

(*b*) *Dir, Swat and Chitral-Drosh.*—No report was received for the month of March. Snow fell on 8 days in April on the Lowarai Pass and the Madaglasht Hills to a total depth of about 4 ft. There was no snowfall in May. At the end of May there were 3 to 4 ft. of accumulations on the Lowarai Pass and the Madaglasht Peak, 15,000 ft. high. These were above normal.

Chitral.—During May there was snowfall, on the higher ranges and the accumulations were reported to be above the average.

Malakand.—Snow fell on 2 days in March and on 1 day in April. There was no snowfall during May. The falls were about the average in March and below it in April.

The accumulations at the end of each month are given below. The accumulations at the end of May were reported to be below normal.

Locality.	March.	April.	May.
	Ft.	Ft.	Ft.
Lowarai	27	16	5
Bashkar	41	17	9
Hindu Raj	34	6	...
Mankial	42	20	10
Illam and Dosara ..	30	4	...

(*c*) *Kurram.*—No reports were received for March and April. The accumulations at the end of May on the well-known peaks and passes were—Sikaram Peak 4½ in., Badin Peak 3½ in., Zeran Pass 1 in. and Sikaram Pass 1½ in. These were about normal.

(*d*) *Kohat.*—Fort Lockhart had no snowfall during these months.

(*e*) *Khyber Agency.* There was no snowfall either in Jamrud or in Landikotal during the period.

IV.—Kashmir.

(*a*) *Skardu.*—It snowed for 4 days during March at the station. On the surrounding mountains, there were several falls in March and the depth of snow on each occasion was a foot or less. In April also, occasional light falls occurred on the mountain peaks, the snowline descending to 9,000 ft. There was no snowfall in May. No accumulations existed at the station proper throughout the period, but on the higher passes there were 6 to 7 ft. of snow at the end of March and 4 to 5 ft. at the end of April. The little snow that was present at the end of May was rapidly melting away.

(*b*) *Dras.*—Snow fell on 18 days in March and 6 days in April. There was no snowfall in May. All the hills surrounding Dras were totally covered with snow during March and April. At Dras proper there was 70 in. of snow on the ground at the end of March, 42 in. at the end of April and no snow at the end of May. The accumulations on the Mashkoo Hill were 18 ft., 16 ft. and 5 ft. respectively at the end of the 3 months. The falls and accumulations were above normal.

(*c*) *Srinagar.*—Four light falls of snow were recorded during March at the central observatory at Srinagar, all these occurring during the first week of the month. In the surrounding Pir Panjal mountain range sveral light to moderate falls occurred in March, 6 falls in April and 5 in May. The thickness of the snowfalls varied from 1 to 1½ ft. in March, ½ to 1 ft. in April and 3 in. to 1 ft. in May. The accumulations of snow at the Banital Pass in the Pir Panjal Range were 15 ft., 12 ft., and 2 ft. respectively at the end of the 3 months. The falls and accumulations were above normal.

(*d*) *Gulmarg.*—No information regarding snowfall during the period was received except that it snowed during the 30th and 31st May on the Affarwat and Handibal mountain ranges. The falls were light and 2 to 4 in. in thickness. Snow existed in abundance at the end of the period on the surrounding mountains extending upto Khalanmarg. The thickness was reported to be 1½ to 2½ ft. especially in the gorges. The accumulations were above normal.

(*e*) *Kargil.*—Snow fell on 11 days in March and on 3 days in April. There was no snowfall in May. There was ½ a foot of accumulations on the ground at the end of March which melted away later. The accumulations on the surrounding high peaks were 12, 9 and 4 ft. respectively at the end of each month. The falls and accumulations were above normal.

(*f*) *Sonamarg.*—There were 15 days of snowfall in March, 10 days in April and none in May. The falls were heavy in March and moderate in April; but the snow on the ground melted away rapidly. The accumulations in Sonamarg proper were about 5 ft. at the end of March, 1½ ft. at the end of April and *nil* at the end of May. On Zojilla Pass, the accumulations were estimated to be 7, 6 and 2 ft. respectively at the end of the 3 months. The falls were above the average, while the accumulations were a little below it.

(*g*) *Leh.*—Snow fell on 13 days in March, 4 days in April and 2 days in May. The accumulations of snow on the higher passes at the end of each of the 3 months were about 6 ft., 4 ft. and 3 ft. respectively (in some passes they were even higher). The accumulations were above normal. Snowline descended to 11,000 ft., 13,000 ft. and 13,500 ft. respectively in the 3 months. At the end of May, the passes were still closed to animal traffic.

V.—The Punjab.

(*a*) *Rawalpindi.*—Snow fell on 3 days in March, to a total depth of 3½ in. There was no snowfall in April and May.

(*b*) *Chamba.*—In March snowfall occurred on 2 days in the Tisa Range to depths varying from ½ to 4 in. in various places, on 3 days in the Bhandal Range to a total depth of 3 in. at Bhandal (6,000 ft.) and on 3 days in the Dalhousie Range to a total depth of 16 in. The falls were generally below the average. No information is available for April. By the end of May the accumulations of snow on the well-known passes and peaks of Chamba State were estimated to be 10 to 12 ft. and were reported to be above the average.

(*c*) *Kangra.*—No reports have been received.

(*d*) *Kilba* (*Simla District*).—There were 2 snowfalls in March at Sangla and Purbani and one in April at Sangla, the snowline descending to 7,600 ft. and 8,200 ft. respectively. In May it snowed at the elevations above 9,600 ft. All the passes were closed to traffic during March and April and Rupen was the only pass open at the end of May. The falls and accumulations were reported to be below the average.

VI.—The United Provinces.

(*a*) *Almora.*—The following table gives the amounts of falls and accumulations for each month. The falls during and the accumulations at the end of the season were generally above normal.

Locality.	March.	April.	May.
Falls.	Ft.	Ft.	Ft.
Malla Danpur	2	2	1
Malla Darma	1½	3½	1
Chaudans	12	6½	4
Byans	13	8¾	2
Malla Johar	No report.	No report.	Nil.
Accumulations			
Pindar Valley... ...	61	61	60
Nandakhat	61	61	60
Sundar Dhunga ...	61	61	60
Bankatia	77	77	75
Maeurleg	27	20	16
Lipu	23	10	6
Lampia	37	15	9
Nuwe	30	30	25

(*b*) *Garhwal.*—There were four snowfalls in March, one light fall in April and two falls in May. The depth of the falls on the higher elevations varied from 1½ in. to ½ ft. in March and ½ ft. to 1 ft. in May. The snowline descended to 9,000 ft. in May. The accumulations on the well-known higher passes were about ½ ft. in March. At the elevations above 10,000 ft. the accumulations at the end of May were about 20 ft. and were nearly normal.

South-West Monsoon Period—June-September 1945.

JUNE and JULY.

I.—Afghanistan.

Kabul.—There was no snowfall in Afghanistan during June and July. As usual at the end of July snow had melted from the mountains and passes except in a few crevices.

II.—North-West Frontier Province.

(*a*) *Hazara.*—No reliable report regarding snowfall during the period was received.

(*b*) *Dir, Swat and Chitral-Drosh.*—There was no snowfall either at Drosh or in the surrounding areas during the period. There were 3 to 4 ft. of snow accumulations on the peaks of the Lowarai Range and Madaglasht Hills at the end of June and 2 to 3 ft. at the end of July. The accumulations were reported to be above the average. Lowarai Pass was open to mule traffic in the first week of June.

Chitral.—No snowfall was reported. The accumulations were thick above 15,000 ft. and were above normal.

Malakand.—No snowfall occurred during the period. The accumulations at the end of June and July are given below:—

Locality.	June.	July.
	Ft.	Ft.
Mankyal	5	4
Sashkar	2	1½

(*c*) *Khyber Agency.*—There was no snowfall during June and July nor were there any accumulations on the mountain ranges and passes at the end of July.

(*d*) *Kurram.*—No snowfall occurred during the period. The approximate accumulations at the end of the period on the well-known peaks and passes were:—

Sikaram Peak	4"
Badina Peak	2½"
Zeran and Sikaram Passes	1"

and were normal.

(*e*) *South Waziristan.*—There was no snowfall during June. No report was received for July.

III.—Kashmir.

(*a*) *Skardu.*—There was no snowfall during the period. At the end of July, the snow on the surrounding passes had melted away but some accumulations were visible on the surrounding high mountain peaks.

(*b*) *Dras.*—No snowfall occurred during June and July nor were there any accumulations on the surrounding hills at the end of the period.

(*c*) *Srinagar.*—Three light to moderate falls of snow 2 to 6 in. in thickness occurred on the Pir Panjal mountain range, surrounding the Srinagar valley during the first fortnight of June. There was no snowfall during July. The accumulations on the passes and peaks of the surrounding mountains had melted away by the end of July. The falls were below normal.

(*d*) *Gulmarg.*—Snow fell to a depth of 2 to 4 in. on the Affarwat and Handibal Ranges during the first fortnight of June. There was no snowfall during the rest of the period. The falls in June were reported to be above normal. There were accumulations 1½ to 2½ ft. in thickness on the surrounding mountain gorges at the end of June. At the end of July however, only very thin layers of accumulations were reported to exist on some of the higher peaks and gorges of Affarwat and Handibal mountains. The falls and accumulations Were reported to be above the average.

(*e*) *Kargil.*—There was no snowfall during the period. The accumulations on the well-known neighbouring mountain peaks were about 8 ft. at the end of June and 2 ft. at the end of July.

(*f*) *Sonamarg.*—No snow fell during the period. Traces of snow were present at unusually high levels on the higher peaks and passes at the end of July.

(*g*) *Leh.*—There was no snowfall during the period. The snowline was at 16,000 ft. in June and 20,000 ft. in July. The accumulations on the high passes were about 8 ft. at the end of June and *nil* at the end of July and these were about the average.

IV.—The Punjab.

(*a*) *Chamba.*—There were four snowfalls in June at elevations above 10,000 ft. and one in July above 12,500 ft. The accumulations of snow on the well-known peaks and passes extended down to 10,000 ft. owing to the heavy snowfall during the winter and were above normal.

(*b*) *Kangra.*—Light falls of snow occurred during the period at elevations above 18,000 ft. and the accumulations were estimated to be below the average.

(*c*) *Kilba Hills.*—The few falls that occurred during the period were confined to higher elevations. Snowline descended to 9,900 ft. in June and 14,500 ft. in July. All the passes were open to traffic during the period. The falls were below normal.

V.—The United Provinces.

Almora.—The following table gives the aggregate falls during and the accumulations at the end of June and July on the well-known passes and peaks. The falls were about normal while the accumulations were above normal.

Locality.	June.	July.
Falls.	Ft.	Ft.
Malla Danpur	1	1
Malla Darma	¾	½
Chaudans	4½	7
Byans	8	8
Malla Johar	½	No report.
Accumulations.		
Pindar Valley	57	55
Nandakhat	57	55
Sundar Dhunga	57	55
Bankatia	73	70
Masurleg	4½	8
Lipu	28	6
Lampia	12	9
Nuwe	15	15
Hasaling	13½	No report.

Garhwal.—Snow fell on the peaks of Nandadevi and Trisuli in the beginning of June, the snowline descending to 16,000 ft. There was also one fall during July. About 6 in. of accumulations existed in the valleys at the end of July.

AUGUST and SEPTEMBER.

I.—Afghanistan.

Kabul.—No information has been received,

II.—North-West Frontier Province.

Malakand.—There was no snowfall in August. One snowfall 6 in. in depth occurred in Lowarai in September. The accumulations on the well-known peaks are given below :—

Locality.	August.	September.
	Ft.	Ft.
Bashkar	4	2
Mankial	1½	8

III.—Kashmir.

(*a*) *Skardu.*—There was no snowfall in August. In September there was no snowfall at the station proper but three light falls occurred on the surrounding high mountains and the snowline descended to 10,000 ft. There were no accumulations either at the station proper or on the surrounding passes at the end of August; but accumulations of a few inches were reported to exist on the higher passes at the end of September.

(*b*) *Dras.*—No snowfall occurred during the period nor were there any accumulations at the end of September.

(*c*) *Srinagar.*—There was no snowfall during August. In September however, three light falls each 4 to 6 in. in depth, were observed on the surrounding mountain ranges, especially the Affarwat Range. The falls were below the average. The accumulations had melted away by the end of August except in some passes and on leeward peaks; but there was 3 to 6 in. of snow on the surrounding mountains by the end of September.

(*d*) *Gulmarg.*—There was no snowfall in August. A light fall 2 to 4 in. in thickness occurred on the Affarwat and Handibal mountain ranges during the last week of September. The falls during and the accumulations at the end of the period were said to be above normal.

(*e*) *Kargil.*—There was no snowfall during the period nor were there any accumulations.

(*f*) *Sonamarg.*—No snowfall occurred in August. In September a few very light falls occurred on the higher mountains around. The snow melted away immediately. Excepting for traces of snow on the higher peaks there were no accumulations at the end of the period.

(*g*) *Leh.*—No snow fell in August. Snow estimated to be 1 to 2 in. in thickness fell on the hills on the 26th September when the snowline descended to 15,000 ft. This snow remained as accumulations at the end of the period.

IV.—The Punjab.

Kilba.—There was no snowfall in August. It snowed at higher elevations in September, the snowline descending to 12,800 ft. The falls were said to be above normal. Though under snow, the passes were passable during September.

V.—The United Provinces.

Almora.—The falls and accumulations of snow are given in the following table. The accumulations at the end of the period were above normal.

Locality.	August.	September.
Falls.	Ft.	Ft.
Malla Danpur	1	2
Malla Darma	1	—
Chaudans	6	8
Byans	—	12½
Malla Johar	½	—
Accumulations.		
Pindar Valley	55	65
Nandakhat	53	53
Sundar Dhunga	53	53
Baukatia	70	70
Masurleg	5	9
Lipu	—	6
Lampia	—	9
Nuwe	15	—
Untadhara	1½	—

Garhwal.—There was no snowfall during the period.

The Retreating Monsoon Period—October to December.

I.—Afghanistan.

Kabul.—Light falls of snow were observed on the peaks of the Hindukush (14,000) and Paghman (8,000) ranges on 2 days in October, 7 days in November and on 1 day in the first fortnight of December. In Kabul, proper, the first snowfall of the season occurred on the 19th December, to a depth of 4 in. There was one more fall to a depth of 4 in. on the 21st. By about the 10th December there were no accumulations at elevations below 11,000 ft. but there existed 3 in. to 4 in. at 11,500 ft. and about 1 foot at 12,000 ft. and above on the Hindukush. The falls and accumulations at the end of the period were below the average.

II.—Baluchistan.

Quetta.—Reports for the period ending on the 21st December show that there was one light fall at Quetta and that snow fell on 5 days on the surrounding mountain peaks.

III.—North-West Frontier Province.

(*a*) *Hazara.*—Reports for October and November were not received. Snowfall occurred on 1 day in December at the following places. The falls during and accumulations at the end of December are given below. These were below the average.

Locality.	Height a. s. l.	Falls.	Accumulations.
	Ft.	Ft.	Ft.
Thandiani	8,600	1½	½
Birangali	6,600	¾	½
Dungagali	8,000	1½	½
Kalabagh	7,900	1½	½
Narang	8,000	4	3
Pindran	7,500	3	2
Kagan	7,000	1½	1
Jared	5,000	½	Nil.
Sundi	—	2½	2½
Kund	—	2½	2½
Dagri	—	2½	1
Satu	—	¾	¼
Shogran	—	½	½
Una peak	—	3	3

(*b*) *Dir, Swat and Chitral-Drosh.*—There was no snowfall at the station proper. Snow fell on 1 day each in November and December on the high mountains and peaks. The depth of the fall in November was 1 to 2 ft. at lower elevations and 4 to 5 ft. at higher elevations. Snowfall was reported to be late this year.

Malakand.—No report was received for October. Three snowfalls occurred in November giving snow to a total depth of about 2 ft. on the hill ranges. The accumulations at the end of November and the falls during December on the well-known peaks are given below. There was about 6 ft. of accumulations on the peaks by the end of December.

Locality.	Accumulations at the end of November.	Falls during December.
	Ft.	Ft.
Lowarai	2 (top)	6
Bashkar	4	7
Mankial	2	8
Illam and Dwa Sarai	1	6
Hindu Baj	3	9

The falls and accumulations were about normal.

(*c*) *Kurram.*—Snow fell on 1 day at Parachinar and on 5 days on the Sikaram, Badina Khushkharam. Mundair and other peaks of the Kohi-Sufaid up to the 26th December. The peaks were all covered with snow.

IV.—Kashmir.

(*a*) *Skardu.*—No snowfall occurred at the station proper during October and November. But there were occasional snowfalls on the surrounding mountains during October, when the snowline descended to about 9,000 ft. The accumulations on the passes at the end of October and November were about 9 in. and 1 foot respectively. During December there was 1 light snowfall at Skardu proper and the snow when melted and measured as water amounted to 1 cent. Snow fell on the surrounding mountain ranges also. There were no accumulations at the station proper, but on the surrounding passes about 2 ft. of snow existed at the end of December. The falls and accumulations were below the average.

(*b*) *Dras.*—Snow fell on 2 days in October and on 4 days each in the months of November and December. The accumulations were as shown under:—

Locality.	October.	November.	December.
	In.	In.	In.
Mushkoo Hill	6	18	30
Dras.	2	3	6

The Zojilla Pass was open in October and closed during November and December. The falls as well as the accumulations were reported to be below normal.

(*c*) *Srinagar.*—Five light falls of snow, of thickness varying from 2 to 4 in. were observed on the Pir Panjal mountain range in October. 8 light to moderate falls 4-6 in. in thickness, and 8 falls 1 to 1½ ft. in thickness were observed on the same mountains in November and December respectively. In December there was also 1 snowfall in the Srinagar valley. The accumulations of snow on the surrounding mountains especially the Pir Panjal Range were reported to be 5 to 8 in. at the end of October, 6 in. to 1 ft. at the end of November and 1 to 2 ft. at the end of December.

(*d*) *Gulmarg.*—The report received for the first fortnight of October shows that there were 2 falls of snow 2 to 4 in. in thickness on the Affarwat and Handibal mountain ranges. The falls descended down to Khalaumarg. The falls and accumulations on the surrounding ranges were said to be above normal.

(*e*) *Kargil.*—There was no snowfall at the station in October. It snowed twice in November, the snowline descending almost to the base of the near-by mountains. Snow fell on 8 days during December. The depth of snow on the well-known surrounding peaks amounted to 1½ ft., 3 ft. and 5 ft. respectively at the end of each of the months. The accumulations were slightly above the average.

(*f*) *Sonamarg.*—There were 4 snowfalls in October and the amount of snow when melted and measured as water amounted to a total of 2·90″. The snowline descended down to the Sonamarg valley. It snowed on 7 days in each of the months November and December. The snow when melted measured 1·84″ in November and 2·81″ in December. The accumulations at the end of the period were about 14 in. at Sonamarg and 2 ft. on the Zojilla mountains. The falls and accumulations were below normal.

(*g*) *Leh.*—Snow fell at the station on 2 occasions in October. As a result of the falls on the hills the snowline descended to 13,000 ft. There was no snowfall in November. Snow fell on 4 days in December the amount of snow on each occasion being ½ to 1 in. The accumulations on the neighbouring passes were ½ to 1 ft. at the end of October, 1½ to 2 ft. at the end of November and 1 to 1½ ft. at the end of December. The falls and accumulations were slightly below the average.

V.—The Punjab.

(*a*) *Chamba.*—No report was received for October. Two falls of snow to a total depth of 10 in. occurred at Kilar (8,400 ft. a. s. l.) in the Pangi Range during November. The range was covered with snow and the snowline descended to 7,000 ft. in places. The accumulations on the Sach Pass by the end of November were 8 to 10 ft. During December there was 1 snowfall in the Chamba Range at high altitudes, the snowline coming down to 4,500 ft., snow also fell on 1 day at Kilar to a depth of 18 in. and on 3 days on the Kalatop Range to a total depth of 16 in., snowline descending to 5,500 ft. on the Kalatop Range of the Chamba Range. In some of the passes the depth of the accumulations at the end of the period were 2 to 3 ft. About a ft. and ½ of snow existed in the crevices of the Kalatop Range also. The falls and the accumulations were below normal.

(*b*) *Kulu (Kangra District).*—Snow fell on the Jalori Range down to a height of 9,000 ft. and on the ranges to the north of Kulu between Kulu and Lahoul down to a height

of 8,000 ft. The accumulations on the peaks at about the end of the period were as follows :—

Hampta Pass (14,000 ft.)	3 ft.
Rohtang Pass (13,000 ft.)	2½ ft.
Chadarkhani Pass (12,000 ft.)	1½ ft.

(*c*) *Kilba* (*Simla District*).—It snowed on several occasions during October and November at higher elevations, the snowline coming down to 8,000 ft. The lower levels had rain followed by hail, especially during the second week, in October, but remained dry during November. During December snowfall was mostly confined to elevations above 14,000 ft., only 1 fall descending to 6,600 ft. but soon melting away. All the passes remained unpassable throughout the period. The falls were below normal. The falls were above the average in October and below it in November and December.

VI.—The United Provinces.

Almora.—The reports received show that the falls during the 8 months and accumulations at the end of December were nearly normal. The falls and accumulations as estimated by the Patwaries are given below :—

Locality.	October.	November.	December.
Falls.	Ft.	Ft.	Ft.
Malla Danpur	2	2	3
Malla Darma	4¾	¾	1¼
Chaudams	7½	4½	3½
Byans	14	Nil.	Nil.
Malla Johar	—	—	—
Accumulations.			
Pindar Valley... ...	55	55	55
Nandakhat	53	53	53
Sundar Dhunga ...	53	53	53
Baukatia	70	70	70
Masurleg	7½	10	9
Lipu	11	21	12
Lampia	16½	28	18
Nuwe Dhura	30	30	30

Garhwal.—There were 8 falls of snow during October, 1 in November and a few in December. The snowline descended to 5,000 ft. and 6,000 ft. in November and December respectively. The depth of the falls at higher altitudes were 2 to 3 ft. in October, about ½ ft. in November and 3 to 4 ft. in December. The falls were above the average in October and below it in November and December The accumulations of snow on the well-known higher passes of the district were about 3 ft. at the end of October, ½ ft. at the end of November and 2 to 3 ft. at the end of December.

VII.—Assam.

(*a*) *Baliapara Frontier Tract*.—No report was received for October. There were scattered falls of snow, 1 to 1½ ft. in depth, in the upper hills viz. the Se La and Me La during November and December. These were reported to be much below the average.

(*b*) *Sadiya Frontier Tract*.—No report of snowfall was received for October. No heavy falls of snow occurred in November. Some snow fell in December on the Abor Hills, on the peaks Taker Adi, Miri Pamdi and Pasudin, all in the upper Minyong country. On the Mishmi Hills light snowfall was reported on 4 days during the latter half of December

(*c*) *Kamrup*.—Snow fell on the Thumsangla and the Oanthala Peaks during November and December. The fall were below the average. No falls on the other peaks were reported.

Summary.

Cold Weather Period—January and February.—Snowfall during the period was above the average in Afghanistan and the North-west Frontier Province and very nearly normal in Baluchistan, Kashmir, the Punjab, the United Provinces and Assam. The accumulations at the end of the period were either normal or slightly above except in the United Provinces where it was a little below the average.

Hot Weather Period—March to May.—There was practically no snowfall in Afghanistan and Baluchistan. Snowfall was above the average in Kashmir, nearly normal in the Nort-hwest Frontier Province and the United Provinces and below normal in the Punjab.

South-West Monsoon Period—June and July.—There was practically no snowfall in Afghanistan, the Northwest Frontier Province and Kashmir, except at higher elevations near Gulmarg and Srinagar. A few falls occurred at higher elevations in the Punjab and near Almora. The accumulations that existed at the end of the period were normal or slightly above.

South-West Monsoon Period—August and September.—There was no snowfall in the Himalayas during August. A few light falls occurred during September at higher elevations. The accumulations that existed at the end of the period were negligible.

Retreating Monsoon Period—October to December.—The falls as well as the accumulations were generally below the average.